Z³ Technology

User's Manual

HD Multi-format Video Encoder

Model Name: Z3-MVE-02

Version 1.04.16

July 17, 2012

Before attempting to connect or operate this product, please read these instructions carefully and save the manual for future use.

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Revision History

Version	Date	Change Note	Author
1.1.0	1/5/10	Original System	AC
1.1.1	5/6/10	Updated System	AC
1.1.2	5/7/10	Made correction	AC
1.1.3	6/25/10	Added MPEG-2 TS and HTTP Option	AC
1.1.4	11/11/10	Added Web Server Control of System	CH
1.1.5	11/17/10	Updated VLC Instructions	CH
1.1.6	5/17/11	Updated Encoder Configuration Options	CH
1.1.7	5/20/11	Updated Web Server Image, Manual Layout	CH
1.2.2	6/13/11	Updated Features and synchronized document with SW version	CH
1.0.4	1/27/12	Updated Images, Layout, TOC, Section 8, Section 10	CH
1.0.4.1	2/7/12	Updated Screen Encode and decode Screen Shots, Highlight Nptes	SC
1.0.4.2	2/13/12	Added Troubleshooting Section	CH
1.04.15	6/8/12	Updated SW Version	SC
1.04.16	7/17/12	Address Update	NS

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1.0 GENERAL INFORMATION

1.1 PREFACE

The Z3-MVE-02 Multi-Format Video Encoder is a compact 114mm x 203mm system that supports H.264 High Profile encode up to 1080p at 30 frames per second. This solution works in multiple applications, such as low cost broadcast encoders, low bandwidth video security, satellite uplink, remote monitoring and industrial applications. The Z3-MVE-02 provides immediate access to multi-format HD video, integrated system peripherals and production-qualified codecs.

The Z3-MVE-02 offers multi-format, multi-channel HD video up to 1080p30. The Z3-MVE-02 features HD performance, compact size, and low latency while having less power consumption than a PC-based encoder platform.

2.0 ABOUT THE MANUAL

Before attempting to connect or operate this product, please read these instructions carefully and save this manual for future use.

3.0 PARTS LIST

3.1 INCLUDED PARTS

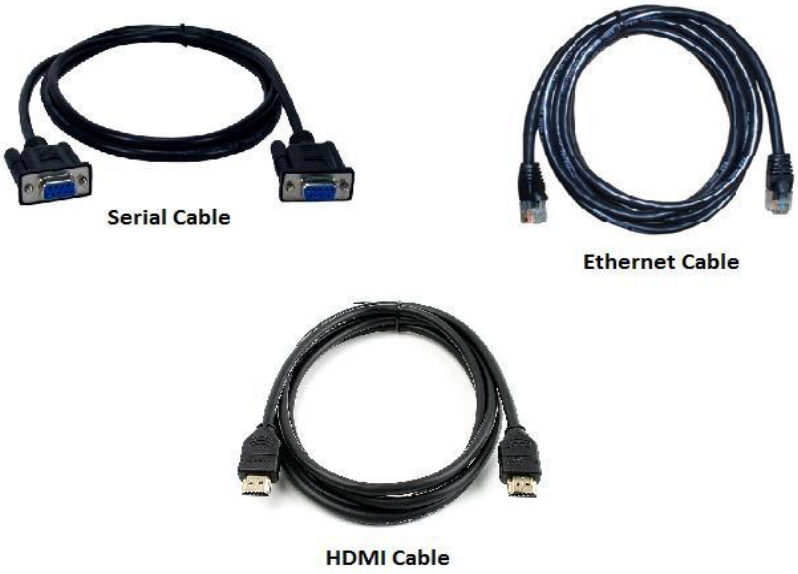
Z3-MVE-02

Power Supply

BNC to RCA Cable (x3)

RCA to RCA Cable

3.2 OPTIONAL ACCESSORIES



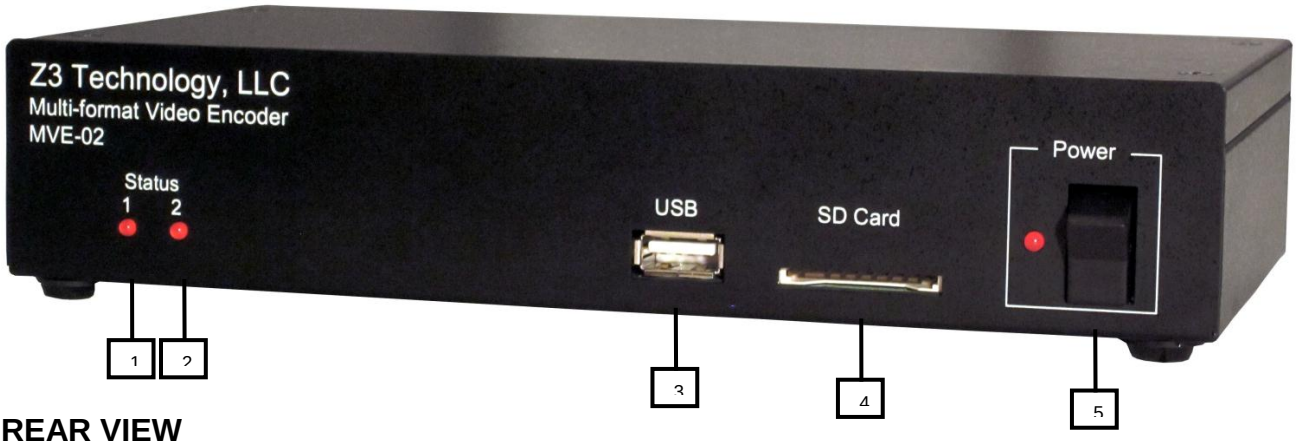
4.0 FEATURES

The Z3-MVE-02 is a high definition, low cost, network-enabled media encoder with the following features:

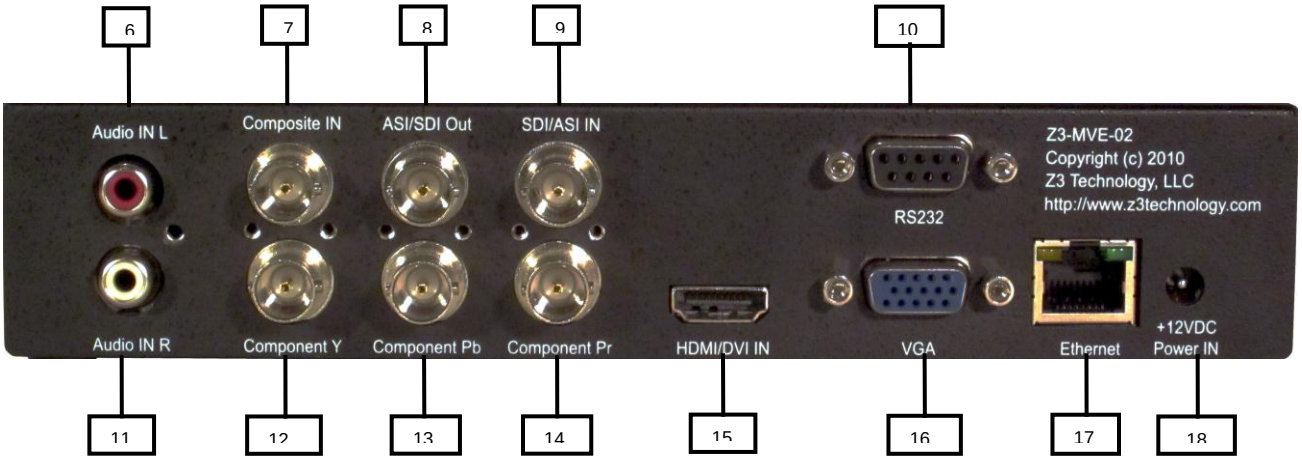
- HD resolutions up to 1920x1080 including 1080i, 1080p30 and 720p
- Supported video includes H.264, MPEG-4, and MPEG-2
- Standard Definition encoding for ISDB-T, DVB-H, ...etc.
- Low latency encode mode
- Video Inputs: Composite, Component, HD-SDI, DVI, HDMI (Optional ASI input)
- Input video re-sizer supports 1/2, 2/3 and 3/4 of standard resolutions
- Output Interfaces: Ethernet and ASI (Optional HD-SDI output)
- Outputs RTP or MPEG-2 Transport Stream
- USB interface for mass storage devices or other peripherals
- SD Card interface for local storage and firmware updates
- RS232 serial port for configuration and control
- Web-based configuration software

5.0 OPERATING CONTROLS

FRONT VIEW



REAR VIEW



1	Status 1 LED
2	Status 2 LED
3	USB Interface
4	SD Card Interface
5	Power Switch
6	Analog Audio In L
7	Composite In
8	ASI/SDI Out
9	SDI/ASI In
10	RS-232 Port
11	Audio In R
12	Component Y
13	Component Pb
14	Component Pr
15	HDMI/DVI In
16	VGA In
17	Ethernet
18	12V Power

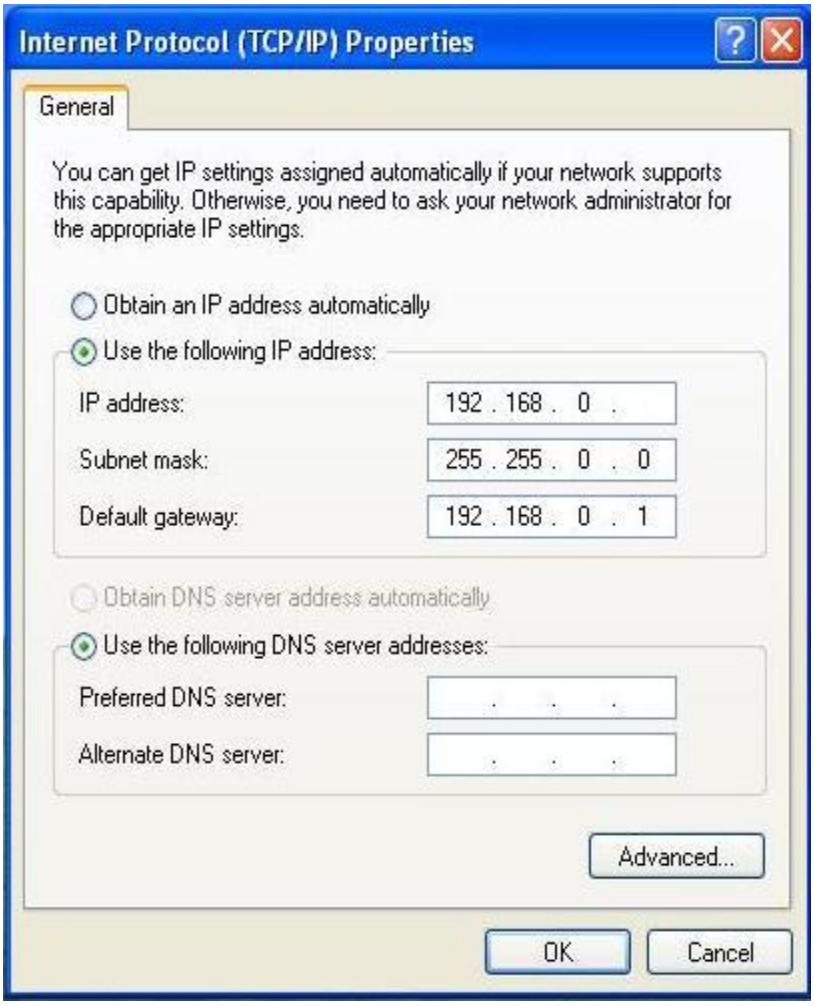
6.0 SYSTEM CONNECTIONS

The System can be controlled via the Web Server on the Z3-MVE-02. It can also be controlled via the serial port.

6.1 PC SETUP

Initially, the simplest way to setup the networked PC to communicate with the Z3-MVE-02 is to put the PC on the same subnet as the Z3-MVE-02. The IP address of the Z3-MVE-02 can be found on the bottom side of the Z3-MVE-02. The Windows PC can be setup on the same subnet by using these parameters:

NOTE: The static IP of the computer cannot be the same as the static IP of the Z3-MVE-02


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 0 .
Subnet mask:
255 . 255 . 0 . 0
Default gateway:
192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Microsoft Windows users

1. Go to the Start Menu and select Control Panel
2. Click on Network and Sharing Center
3. Click on View Status
4. Click on Properties.
5. Click Internet Protocol (TCP/IP) and click Properties.
6. In the Internet Protocol (TCP/IP) Properties window, select "Use the following IP address" if not already selected and specify the IP address you wish to use. While entering this data you'll also need to specify the subnet mask and default gateway.

Linux users

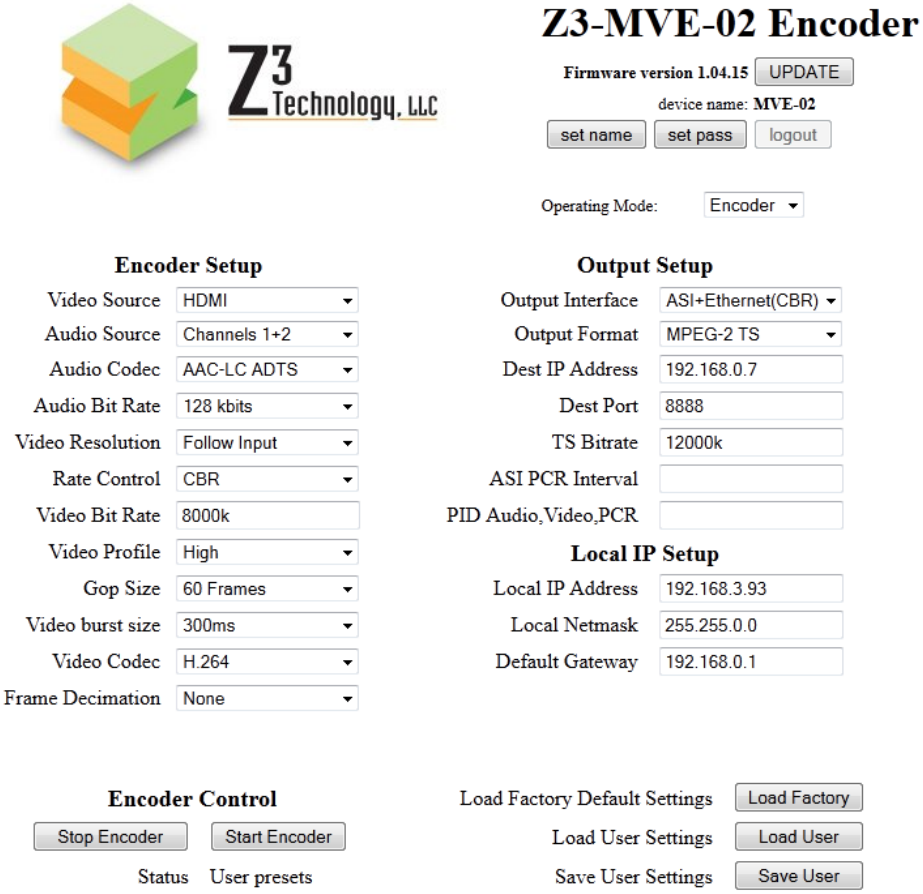
The below information is for how to specify and adjust your network settings through the command prompt. Changing your network settings will require root access.

1. Get to the command prompt.
2. Move to the /etc/sysconfig/network directory.
3. Edit the interfaces file and adjust your network settings in this file.

6.2 WEB SERVER - ENCODER

Note: If you use unicast on the encoder, you must also use unicast on the VLC receiver. If you use multicast on the encoder, you must also use multicast on the VLC receiver.

1. Power on the Z3-MVE-02
2. Wait one minute or until LED “Status 1” on the unit lights up
3. Connect the Ethernet cable from the Z3-MVE-02 unit directly to the PC
4. Disable all wireless and local area connections
5. For a client PC to access the Z3-MVE-02 factory default settings, set the IP address of the PC to 192.168.XX.XX (See 5.1 PC Setup)
6. Open Firefox or Internet Explorer 8 (or above) as your web browser.
7. Type the **IP address of the Z3-MVE-02** in your web browser (http://192.168.XX.XX) and the Z3-MVE-02 Encoder web configuration menu will appear
8. Configure the Z3-MVE-02 with your desired settings
9. Press “Start Encoder” on the Encoder Control menu.
10. Status 2 LD should now be lit and the title in the top-right of the browser should now say “MVE-02 Encoder” as pictured here in the example.



6.3 LOCAL IP SETTINGS – ENCODER

- In the Local IP Settings Section type in your desired Local IP settings
- Hit “Save User” to save your desired settings
- Power cycle the Z3-MVE-02
- The new IP settings will now take effect

6.4 ENCODER CONFIGURATION OPTIONS

Encoder Setup	
Video Source	SDI, HDMI, Component, Composite
Audio Source	Analog Jacks, Channels 1+2, Channels 3+4, Channels 5+6, Channels 7+8
Audio Codec	AAC-LC ADTS, AAC-LC LATM, PCM, AC-3 Passthru, None
Video Resolution	Follow Input, 1080i (1920x1080), 3/4 1080i (1440x1080), XGA (1280x1024), 720p (1280x720), 4/5 720p (1024x720), D1 NTSC (720x480), D1 PAL (720x576), 4-CIF (704x576), VGA (640x480) 2-CIF (352x576), CIF (352x288), SIF (352x240), QVGA (320x240), WQVGA (320x180)
Rate Control	CBR, VBR
Video Bit Rate	Custom
Video Profile	Baseline, Main, High
Gop Size	15 Frames, 30 Frames, 60 Frames, 120 Frames, 240 Frames
Video Burst Size	150ms, 200ms, 300ms, 400ms, 500ms, 600ms, 800ms, 1000ms, 1200ms, 1400ms, 1600ms, 1800ms, 2000ms
Video Codec	H.264, MPEG-2
Frame Decimation	1/2, 1/3, 1/4, None

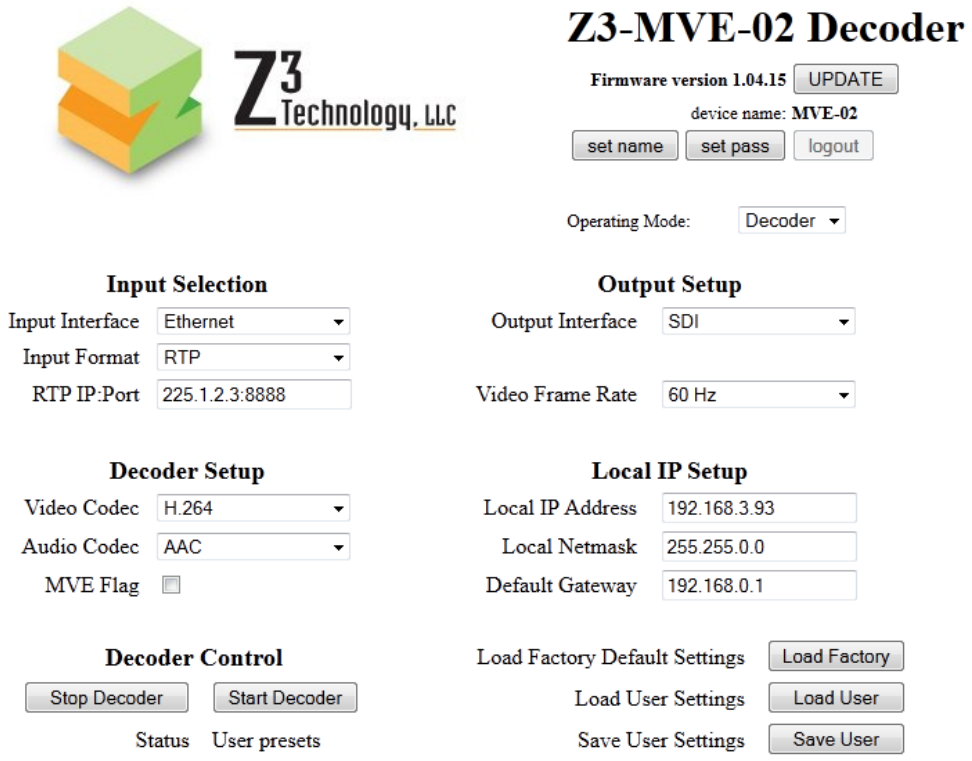
Output Setup	
Output Interface	Ethernet, ASI, ASI+Ethernet
Output Format	RTP, MPEG-2 TS

Dest IP Address	192.168.X.XX (Use IP address of your PC)
Dest Port	8888
PID Audio, Video, PCR	Custom

Local IP Setup	
Local IP Address	192.168.X.XX
Local Netmask	255.255.0.0
Default Gateway	192.168.0.1

6.5 WEB SERVER – DECODER

1. Stop the Encoder by pressing “Stop Encoder” on the server.
2. Press the “Decoder” Button next to “Operating Mode” to change the operating mode to Decoder. The title in the top-right of the browser should now say “MVE-02 Decoder” as pictured here in the example.



6.6 IP SETTINGS – DECODER

1. Once the decoder has stopped, type in your desired IP settings
2. Hit “Save User” to save your desired settings
3. Power cycle the Z3-MVPR-01
4. The new IP settings will now take effect

6.7 DECODER CONFIGURATION OPTIONS

Input Selection	
Input Interface	Ethernet, DVB-ASI
Input Format	RTP, MPEG-2 TS
RTP IP: Port	Custom

Decoder Setup	
Video Codec	H.264
Audio Codec	AAC, PCM, None

Output Setup	
Output Interface	SDI
Video Frame Rate	50Hz, 60Hz

Local IP Setup	
Local IP Address	192.168.X.XX
Local Netmask	255.255.0.0
Default Gateway	192.168.0.XX

7.0 STREAMING OPERATION

After connecting your video/audio source and configuring the Z3-MVE-02 Encoder, hit “Start Encoder” so the status below says “Status: Running.” If you are using the serial command instead, type “S” to start streaming.

The way to set up VLC as your stream receiver on your PC differs depending on the format of your output stream.

If your output format is transport stream, please follow the steps below:

7.1 TRANSPORT STREAM

1. Open VLC Media Player
2. On the Media menu choose “Open Network Stream” (Cntrl + N)
3. If using VLC version **1.0.X**:
   a. On the Protocol menu choose “UDP”
   b. Type in the static IP address of your personal PC
   c. Change the Port Address to “8888”
4. If using VLC version **1.1.X**:
   a. Enter the network URL as follows: udp://@xxx.xxx.xxx.xxx:8888 (where xxx.xxx.xxx.xxx is the IP Address of your personal PC)
5. Press play
6. If the original video is interlaced, the video can be deinterlaced as follows:
   a. On the Video Menu, choose “Deinterlace” and choose an option other than “Disable”

If your output format is real-time transport protocol, please follow the steps below:

7.2 REAL-TIME TRANSPORT PROTOCOL

1. Open VLC Media Player
2. On the Media menu choose “Open File” (Cntrl + O)
3. Under the Media Files category, choose “All Files (*)”
4. Choose the SDP file provided by Z3 Technology
   - Note: If you do not have the SDP file, please to refer to your Z3 Server user account and download the file.
5. If the original video is interlaced, the video can be deinterlaced as follows:
   a. On the Video Menu, choose “Deinterlace” and choose an option other than “Disable”

8.0 DYNAMIC BIT-RATE & FRAME-RATE CHANGE

The dynamic bit-rate and frame-rate control will take effect, if you change *only* the following parameters:

Video Bit Rate
Frame Decimation

After the Video Bit Rate and Frame Decimation rate have been configured to your preferred settings, hit the "Start Encoder" or "Restart Encoder" button.

The web page will respond with:

Status: Changed rate

The video stream will continue uninterrupted with the new parameter.

9.0 APPENDIX A: SERIAL CONTROL

Note: Please only use the serial control if you are experiencing difficulties with the Web Server.

- Plug-in a DB-9 serial cable from the Z3-MVE-02 to your PC
- Set up Teraterm on the PC for 115k, 8, N, 1, N, 1ms/char, 50ms/line
- Connect to the proper COM port
- Connect the Power to the Z3-MVE-02
- Power-on the Z3-MVE-02
- Output should come immediately to the Teraterm console

9.1 TERMINAL OUTPUT

```
                Z3 Technology, LLC MVE-01          v07
                 H.264 Streaming Encoder
+=======================================================+
|                        Current
|   I - Change video input          COMPONENT
|   A - Change audio                aac
|   N - Change network address      225.1.2.3
|   T - Change transport            RTP
|   F - Change framerate divider    1
|   R - Change resolution           1080I
|   G - Change GOP size             60
|   B - Change video bitrate        9000k
|   P - Change H.264 Profile        high
|   Y - Change H.264 QP range       5, 28, 51,0,40
|   C - Change rate control mode    CBR
|   E - Change scan mode            Interlaced
|   D - Change delay limit ms       500
+-------------------------------------------------------------------------------------+
|   1 - Set defaults for D1 streaming
|   2 - Set defaults for 720p streaming
|   3 - Set defaults for 1080I streaming
|
|   S - Start streaming
|   X - eXit to prompt
|   W - Write config to flash
+=======================================================+
Enter option:
```

9.2 SYSTEM MENU CONTROL

Streaming Encoder System Menu Control	
I - Video Input Options	Component_A, Composite, HDMI, HD-SDI,
A - Audio Encoder Options	AAC, PCM, None
N - Network Address	Multicast or Unicast Address
T - Transport	RTP, TS
F - Frame Rate Divider	1, 2, 3, 4, 5
R - Resolution	Follow Input, Custom, 720p, 1080i, D1 NTSC, D1 PAL, 4-CIF, 2-CIF, CIF, QCIF
G - Gop Size	15 Frames, 30 Frames, 60 Frames, 120 Frames, 240 Frames
B - Bitrate	Custom, 50k, 64k, 128k, 250k, 500k, 750k, 1500k, 2000k, 2500k, 3000k, 3500k, 4000k, 12000k
P - H.264 Profile	Baseline, Main, High, Fast
Y - H.264 QP Range	**H.264 QP range format:** <min>, <init>, <max>, <minIntra>, <maxIntra> Example: 5, 28, 48, 0, 40 means: -Inter-frame QP ranges from 5 to 48 -Initial QP of 28 -Intra-frame QP ranges from 0 to 40 *Minimum allowed is 0, maximum is 51
C - Rate Control Mode	CBR, VBR, Storage
E - Scan Mode	Interlaced, Progressive
D - Delay Limit	150ms, 300ms, 500ms, 1000ms, 2000ms

10.0 UPDATING FIRMWARE

10.1 WEB PAGE

- Locate the UPD-z3-mve02-v1.04.15.img file on your Z3 Server user account
- Save the file on your PC where it can easily be found
- Follow steps 1 through 7 in section 6.2 WEB SERVER - ENCODER
- On the web menu, next to “Firmware Version 1.0.4”, hit the Update button
- Hit Browse to find the saved .img file on your PC
- Hit Upload & Update
- Power off unit

- Power cycle system for clean boot and system should be updated.

10.2 SD CARD

- Locate the UPD-z3-mve02-v1.04.15.img file on your Z3 Server user account
- Place SD card into computer
- Open the zwriter.exe windows program (provided by Z3)
- Select the UPD-z3-mve02-v1.04.15.img file
- Select correct location for your SD card Do NOT make mistake on this item. This will cause wherever you are writing to be overwritten. There is no recovery once you hit “Write Device”
- Eject SD card from computer
- Place in SD card socket of APP board
- Power on system with terminal output connected to PC
- You will see the system updating the flash
- Once complete, the system will boot.
- Power off unit
- **Remove SD card**
- Power cycle system for clean boot and system should be updated.

11.0 TROUBLESHOOTING

No video is usually caused by networking issues.

- First: check IP address and Netmask. Ping PC from Z3-MVE-02 and ping Z3-MVE-02 from PC. Use direct connection from Z3-MVE-02 to PC without router/customer network. Once video connection is established, then add in customer specific network equipment.
- Second: check to make sure firewalls are turned off
- Third: check video source. Verify video source is outputting compatible analog video
- Fourth: verify PC is fast enough and has enough DDR to decode compressed video
- Fifth: verify VLC version is 1.1x or later

No SDP file

- Check your Z3 server account